1750 METERS: WESTERN UPDATE #57

THE WESTERN NEWSLETTER FOR THE EXPERIMENTER'S BAND (160 TO 190 KHZ)

Available for business-size 25 cent SASE's, plus 60 cents per issue (or $7 per year)
from: Jim Ericson, 226 Charles St., Sunnyvale, CA 94086

Zero! MORE SASES ON FILE

ACTIVE WESTERN LowFER BEACON STATUS (LIST COMPILED July 3, 1988)

	FREQ(kHz)	IDENT	QTH	SKED INFO
	163.85	M	San Diego CA	24h/7d.
	166.667	H	Descanso, CA	24h/7d
	167.25	AHN	Fallbrook, CA	24h/7d
	169.863	1SUN	Durant, OK	Off till September
	175.225	MAX	Wheatland, WY	24h/7d CW. BPSK/ASCII by request.
	175.703	FAW	Orem, UT	24h/7d
	176.00	HDOMBAY	Morro Bay	24h/7d
	176.26	C O	Glenwood Springs, CO	24h/7d
✓	176.963	C	near Morro Bay, CA	24h/7d.
✓	177.48	UCP	Saratoga, CA	Daily, approx. 1400 to 1700 UTC.
	177.750	CT	Bountiful, UT	24h/7d (BPSK/CCW alternating)
	178.00	AT	Crow, OR	24h/7d.
	179.0	MPM	Salt Lake City, UT	24h/7d ASCII/CW alternating 5minutes.
✓	180.601	NX	Los Altos Hills, CA	24h/7d
	181.17	IZJ	San Gabriel, CA	Daily. Silent 0700 to 1100 UTC.
✓	181.287	MEL	San Jose, CA	24h/7d.
✓	181.711	TLX	Novato, CA	24h/7d
	182.62	FPV	Granada Hills, CA	24h/7d
✓	182.672	G	Palo Alto, CA	24h/7d.
✓	182.88	H2	Descanso, CA	24 hours weekends
✓	183.160	PRK	Saratoga, CA	24h/7d
	183.63	PLI	Toluca Lake, CA	24h/7d
	184.016	EK	Sunnyvale, CA	24h/7d
	184.425	V	Sunnyvale, CA	Occasional testing
	185.0	ZYK	Redway, CA	24h/7d
✓	185.100	T	Rohnert Park, CA	24h/7d At Sonoma State Univ.
	185.49	AZ	Tucson, AZ	Off till September
	186.75	BA	Lancaster, IL	24h/7d
	187.0	ELU	Simi Valley, CA	24h Sat. & Sun on SSB
✓	187.263	SKY	9 mi. NW of San Simeon, CA	By request. Contact Z2 or EK.
	187.30	UPN	Cincinatti, OH	24h/7d
	187.50	DCH	Berlin, MD	Off till September
✓	187.47	SM	San Jose, CA	Heard 7/3/88. Sked Unknown.
	190.4	OHH	Ontario, Canada	24h/7d.

(Check means sig logged at EK QTH in June/July. Double check is QSO with EK. Non-Western listings are beacons currently being copied in the West, or they have SASE's on file with us).

EK NOTES: LowFER-ing is a bit slow this summer in the West as it appears to be elsewhere according to reports from **Herb Balfour** and **Brice Anderson.** However, as Brice points out, if you're a patient listener you WILL hear signals through the QRN. For me, the **T** and **TLX** beacons are usually solid copy at 75 and 50 miles respectively. the **C** beacon in Morro Bay (175 miles) is QSO copy about 25% of the times I listen. The yet-to-be-optimized **SKY** beacon at 115 miles was copied this very morning...almost QSO level. So hang in there!

My backlog of articles for upcoming **WU** issues is rapidly dwindling. If readers don't send it, it sure ain't gonna get printed. Let's hear from you!

Z2 NEWS FOR WU #57- June 28, 1988. Not much 1750m activity here since I closed down the **Z2** transmitter but things have been very busy. Daytime bandscans usually reveal most or all of the following signals: **T** (185.1),**EK, PLI , PRK , H2 , G , FPV , TLX , MEL , IZJ , NX , UCP, C , HDO, H.**

Ranch work has kept me too busy to do much about getting transmitter and antenna stuff down the mountain from **Z2** to the **SKY** site. However, I was able to divert a D-6 Cat from it's road working activities long anough to clear and level a nice 30 by 50 foot pad for the new **SKY** installation. With luck, it should be possible to begin erecting an antenna in July.

As planning progresses for a complete transmit/receive propagation monitoring system it becomes increasingly apparent that the hunt for rare or mythical propagation anomalies will have to take second place to a hard look at just how variable our supposedly stable "groundwaves" really are. Looking at Cliff Buttschardt's two signals (**HDO** 176.000, **C** 176.983), I see daytime variations that don't seem to make sense but which nevertheless appear to be both real and regular. Now the challange is to eliminate or monitor any fluctuations in transmitter output while cooking up a reliable receiving system capable of producing a continuous record on relatively weak signals.

OTHER ACTIVITIES-

I've been able to resume continuous chart recording of earth-currents as of May 28. Ev Paschal's excellent paper on broadband whistler receivers inspired me to build a much cruder receiver that is working quite well on my longwires. I've been making a tape from 1145 to 1215 **UTC** every morning- usually catching a couple of whistlers, often none at all and sometimes dozens of them .

LOWFER TRANSMITTER EFFICIENCY--A PRELIMINARY REPORT

By Cliff Buttschardt W6HDO (HDO)

Quite a bit has been done attempting to increase the efficiency of the one watt LowFER transmitter. The power available for radiation is directly proportional to increased efficiency. In order to compare, the experiementer must state what conditions are being compared. For example, it is of primary importance that the transmitter output be a quality sine wave BEFORE the antenna circuit. The loading coil is not being measured in this case. Most voltmeters are calibrated only for sine waves. Therefore the collector waveform has to be clean under full load without the loading coil for meaningful comparison. Often 25 or 50% duty cycle rectangular drive signals are used on the gate to increase collector efficiency making sine waves difficult.

Two final amplifier tank circuits are common, the parallel resonant circuit and the low pass of PI section filter. The parallel resonant circuit has slightly higher efficency but is ideal only on resonant frequency. The PI filter produces clean sine waves from cutoff to nearly half that frequency. After much experimentation, a filter composed of two .047 ufd capacitors on each side of a 28 microhenry coil is ideal. Use large, quality poly or mylar caps and wind the coil on at least a one inch outside diameter powdered iron toroid. Litz wire has proven to be unnecessary for either circuit. Choose a wire size for coverage of 3/4 the toroid leaving a gap between ends.

Unfortunately, the load resistance, frequency, and power output all alter any spot efficiency measurement. Many FET's are simply too large for the one watt level! In general if fifty percent DC-in to RF-out efficiency can be gotten, the design is good. Please demonstrate any improved efficiencies but remember the rules for comparison!

The Palomar final amplifier is unusually effective when the modifications in vol. 6 number 2 (Feb. '79) LOWDOWN are completed. The parallel tuned tank circuit is magnetically coupled to one of three bobbin loading coils in which a half inch ferrite rod is inserted for adjustment. One useful addition is a Faraday shield between the tank and loading coils, allowing coupling of only magnetic energy. A shield is a series of fingers shorted on one end and grounded to chassis at a single point. Nothing is critical about dimension, since a piece of 1.5 inch square finger stock from a Xerox machine served well. Simply solder the stock such that the tank and loading coil can be replaced to minimun spacing as before. After installation no signals whatsoever could be heard above one MHz, something most welcome when the LowFER beacon is on the premise of a ham station. The final amplifier is a VN80AF driven with square waves and attains 51% system efficiency including the loading coil into a 100 ohm load!

Possibly push pull transistor designs could do better. Any proven designs would be welcome for examination as every milliwatt helps.

BEATING URBAN NOISE HOLES

Experience on 1750 has shown that 1 watt LOWFER beacons can be reliably heard for hundreds of miles IF you have low levels of man-made noise at your listening post. Unfortunatly, most of us are stuck with urban noise holes, where light dimmers and leaking power lines limit reception to local signals.

Several solutions have been kicked around over the years and all have their merits. So, at the risk of here-we-go-again groans, here's another!

I'd like to suggest a remote receiver, connected to a DTMF control/tuning interface, connected to a phone line. Almost any cheap longwave receiver will be stable if you leave it on long enough. A phone line will pass 2-3 kHz of audio and thus 2-3 kHz of the band. You can use a tuneable radio filter at your home and a DTMF control pad to tune to the reciver. Much cheaper than a translator, which would probably be illegal anyway.

Picking a location is the hardest part. With a little effort, a friendly farmer would agree to a small box with a whip on it nailed to a fence post. If they're wooden posts and you mount it at a corner, you've got switchable beverages right there! You'll REALLY hear some DX then! Just be VERY sure the location is quiet day and night before you spend money on the phone line.

We've got some bright minds on longwave, so designing this thing should be a snap. Finding a place to put it will require some effort and a little money, but if several people "time-share" the receiver won't cost much to keep it going. Once you hear signals you've been after for years, (and hear them almost every night!) you'll be glad of the effort.

One thing: two switchable tuned loops or beverages are going to beat the stuffing out of an untuned whip. I've used both from my mobile rig in noise free areas, simulating the set-up.

Any of you bright minds game for a summer project?

73 and CU on LF !
Dave Stinson AB5S/7 NTS

PO Box 5283
Bloomington, Indiana
47407-5283
19 May 1988

Jim Ericson
226 Charles St.
Sunnyvale, CA 94086

Dear Jim,

Newsletters are wonderful things! Enclosed are enough SASE's to finish the year.

I'm trying to enhance the 100-foot range of a pair of 2275-Hz avalanche-beacon transceivers (ELT's for skiers), hoping to make easy-to-build cave radios for mapping. (Swiss cavers used avalanche beacons to locate a new entrance to Holloch, a 75-mile-long cave in the Swiss Alps.) My first experiment nearly doubled the range, simply by putting one beacon transceiver inside my 27"-diameter 500-turn cave-radio receiving antenna (pictured in WU 40) retuned to 2275 Hz. The beacons have internal ferrite-loopstick antennas. I plan to try improved coupling methods, and a regenerative amplifier (Q-multiplier) on the external receiving antenna, and perhaps an external power amplifier for transmit.

Many avalanche beacons operate at both 457 kHz and 2275 Hz. An Austrian friend says, "The reason for the double frequency is that it was not possible to decide between the Austrian (2275 Hz) and the Swiss (457 kHz) frequency; there is no technical reason for it."

My beacons are borrowed and are sealed, so I can't modify them or look inside. I am seeking a source of 2275-Hz-only avalanche beacons and any literature about them, especially schematics.

73,

Frank

Frank Reid
W9MKV

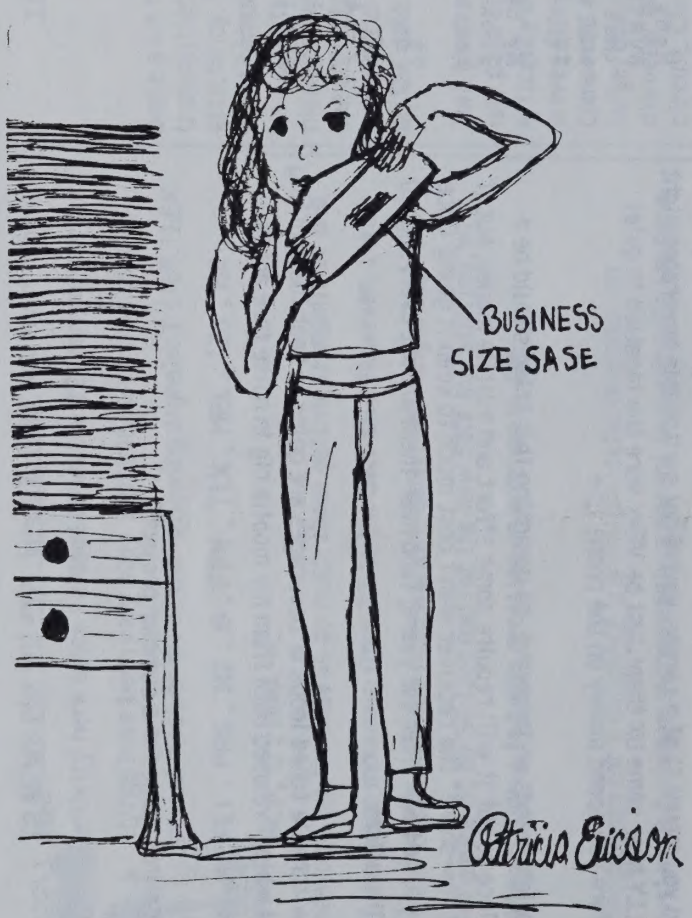
MAILBAG: **Herb Balfour (OHH in Ontario, Canada)** wrote a big letter in June, followed by a phone call yesterday (7/2) with news that he plans to begin producing a LowFER newsletter this month. It will be called the **NORTHERN OBSERVER**, and will cover news of activity in the midwest, east, and Canada. The NORTHERN OBSERVER should help fill the gap which occurred when **Hal Murken** retired from the Eastern **LOWFER LETTER** a few months back. (By the way, kudos to Hal for publishing as many issues as he did. A great job, Hal!).

Herb and I talked about the NORTHERN OBSERVER and our own **WESTERN UPDATE** at the recent LowFER convention here in California. He and I plan to stay in close contact, sharing information, and even trading articles. Herb is taking on a BIG job, and I urge everyone to support his new endeavor. Herb notes, "I have contacted the LOWDOWN, VLF NEWSLETTER, Sheldon Remington, VLF UPDATE, ODXA, SPELEONICS, and the TESLA COIL BUILDERS ASSOCIATION announcing the NORTHERN OBSERVER." He also notes that the initial format will be similar to the WESTERN UPDATE. Since Herb is in Canada, he has decided to set up the following arrangement: Send him UNSTAMPED self-addressed envelopes, and he will affix Canadian postage. The cost will be $10 (US) per year. He will accept checks on US banks...no problem.

Just a note that Herb was the first LowFER in Canada! **Bill DeCarle (OBE)** was the second, and was responsible for throwing open the doors for the priveliges available now to all Canadian Amateurs. Lowfer #3 was Bill's colleague and friend, **Tapio**, located in Uxbridge, Ontario. Number 4 was **Steve Canney.**

Brice Anderson writes, "QRN has generally been over S9. However, if one is willing to listen on a given frequency long enough, the target beacon can often be heard through momentary breaks in the noise. **TH, UPN and WI** have appeared often. This is the first season that east coast beacons have been heard after April. Maybe the increasing sunspots will not be detrimental to LF propagation as feared."

Sheldon Remington published the **NDB DX NEWSLETTER #6** in late June, and wanted us to remind everyone that he has moved. Please note his address change in this issue.



Stan Forsman of Campbell, CA says, "Thank you very much for the sample copy of WU. I had no idea that there were so many 'private' stations down at the bottom! I tried listening down there only because a small list of stations was in the back of Trochimczyk's Radio Beacon Handbook. I am using a Sony ICF-2010 and a Sierra 260B Selective Voltmeter. The Sierra is using a longwire for an antenna."

Dave Stinson (NTS) reports that, "NTS will be back with an umbrella antenna. I don't know if NVA is going to be back. Jon may be going overseas for awhile and will be very busy there. I really missed not being able to attend the Convention. Next Year!"

James Coote (J) writes from Los Angeles that his beacon will be off for awhile. He sent his recommendation for an outfit called **RADIOKIT**, POB 973, Pelham, NH 03076 / tel. 603-635-2235. Their catalog includes items such as transmit coils and caps, ceramic feed-thrus, VMOS, LF-MF grid-dippers, etc. James asks, "Does anyone know of Ham-type memory keyers with a beacon mode and a lot more than the usual 1024 bits? Or, know of a Vic-20/C-64 Ham CW software/black box that will do beacon-type messages, again with LOTS of bits?"

EK NOTES: The pencil-sketch is a self portrait of my daughter, **Tricia** who is 14 years old. Since the beginning of my association with the Western Update, she has taken care of all the envelope stuffing and stamp and envelope licking. Since her word processing skills on the Macintosh computer are at least as good as mine, she will begin taking on more of the publication work, including retyping some copy received from contributors, and some of the manual layout. She's also saving for a car, so we'll tap the kitty to make it worth her while! Please forward all complaints about WU to her, at my address (just kidding!).

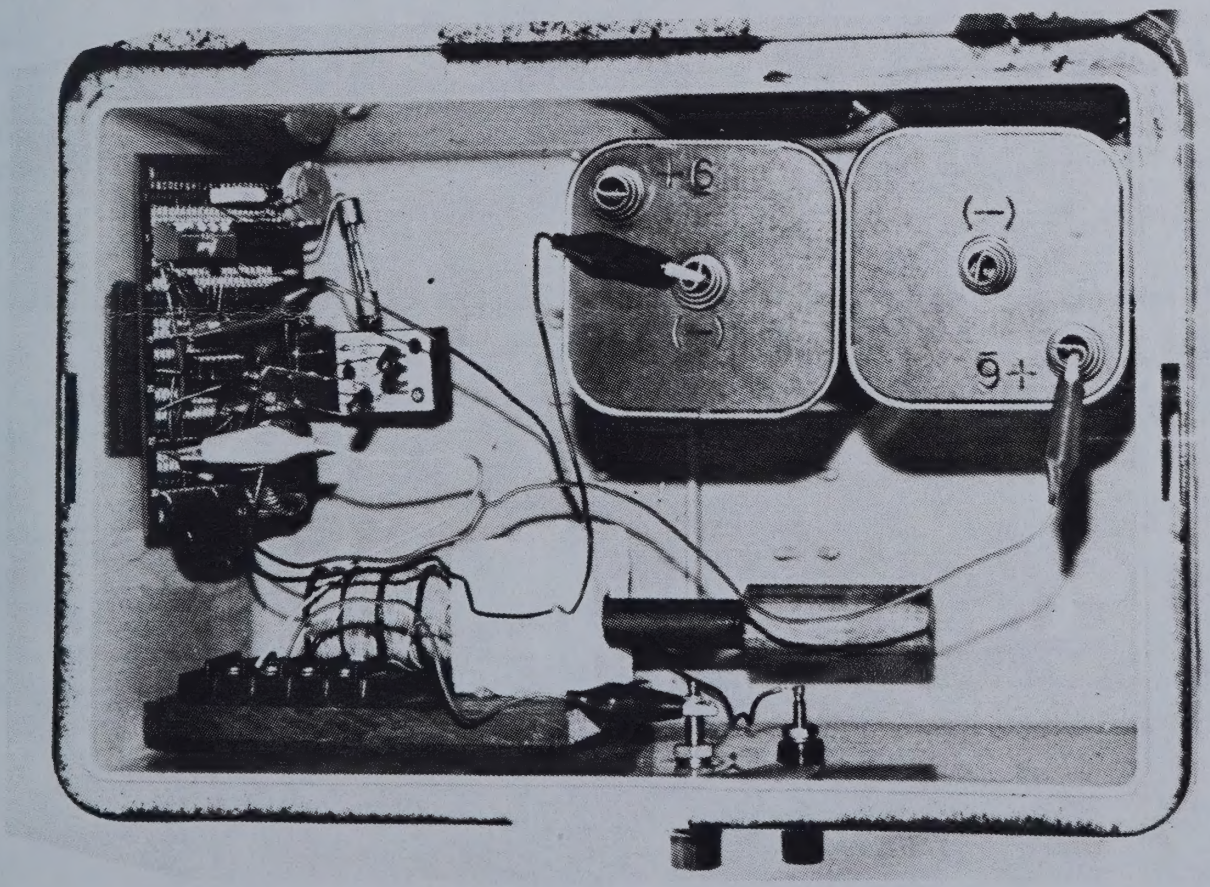
COMMENTS ON THE MIDEKE "SIMPLE BEACON" 1750M XMTR. DESCRIBED IN WU*53

by: Jim Ericson

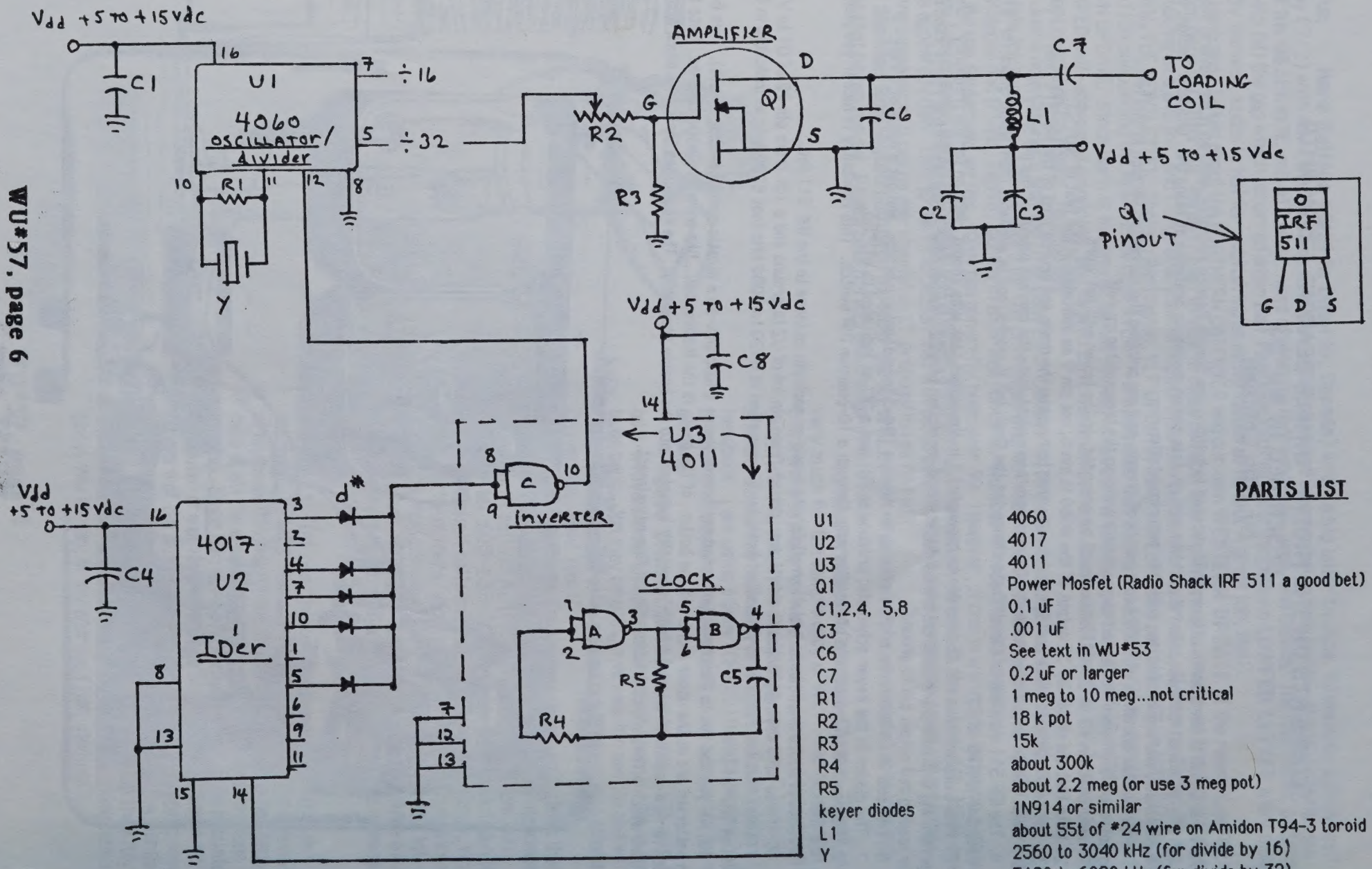
As I mentioned in the previous issue, I did succeed in building the Simple Beacon recently, and ran it for several weeks on 184.425 kHz at 1 watt DC input. As Mike Mideke stated, this design makes no pretense of being the "ultimate" design, but I found it fun to build, and a good starting point for experimentation.

The circuit (as shown in WU*53) had a couple of errors, so I am printing the corrected version in this issue. The following notes are my comments based upon actually building the transmitter myself:

1. Note that pin 15 on the 4017 ID'er must be grounded, or the keyer will not work.
2. Note that the divide by 32 output of the 4060 is pin 5, not pin 9 as indicated in the text of WU*53.
3. The only mistake I make during construction was to reverse the drain and source pins of the IRF 511 final amplifier. When you do this, it draws about 10 amps, and then melts! Note the correct pinout of the IRF 511!
4. The IRF 511 may not be the ultimate choice for the final, but it works, and is available from Radio Shack for $1.99. The part number is 276-2072.
5. Mike's stated value for C6 in order to resonate L1 in the output tank was almost right on for the frequency I chose. When performing this tuning procedure, I used a dummy load consisting of a 22 ohm resistor in series with a 150 pF capacitor from the loading coil output pin to ground.
6. I measured L1 (55 turns of #24 wire on an Amidon T94-3 toroid) using a bridge, and got a value of 79 uH.
7. The diodes in the keyer schematic produce an "R", not a "K" as indicated in WU*53.
8. I connected all ten outputs of the ID'er chip through a 10-position DIP switch. This flexibility is nice if you plan to change the IDENT.
9. Good practice would be to install small ferrite beads on each pin up close to the IRF 511 fet.
10. If you have keying glitches (I didn't), try .001uF from pin 14 of U2 to ground and a 10k from pin 12 of U1 to Vdd.
11. Note that the range of crystals for divide by 32 operation is 5120 to 6080 kHz (not 6280 kHz as indicated in the parts list of WU*53).
12. As you can see in the photo, I mounted my beacon inside a lunchbox-size plastic container (upper left). Two 6 volt lantern batteries are at the upper right. At the bottom of the photo is the loading coil...litz wire on plastic bobbins. Note the 1/2-inch ferrite rod (with wooden handle) partially inserted into the bobbin assembly. The rod slides through a block of styrofoam which offers a nice friction-fit for fine adjustment.



WB6EER "SIMPLE 1750M BEACON" TRANSMITTER, REVISION-1



* NOTE: OUTPUT PINS OF THE 4017 SEQUENCE IN THE ORDER 3, 2, 4, 7, 10, 1, 5, 6, 9, 11.

PARTS LIST

U1	4060
U2	4017
U3	4011
Q1	Power Mosfet (Radio Shack IRF 511 a good bet)
C1,2,4, 5,8	0.1 uF
C3	.001 uF
C6	See text in WU#53
C7	0.2 uF or larger
R1	1 meg to 10 meg...not critical
R2	18 k pot
R3	15k
R4	about 300k
R5	about 2.2 meg (or use 3 meg pot)
keyer diodes	1N914 or similar
L1	about 55t of #24 wire on Amidon T94-3 toroid
Y	2560 to 3040 kHz (for divide by 16) 5120 to 6080 kHz (for divide by 32)